PHILADELPHIA NEUROLOGICAL SOCIETY.

October 26th, 1896. President, Dr. Charles K. Mills, in the chair.

Drs. DeForest Willard and Wm. G. Spiller read a paper, entitled: Concussion of the Spinal Cord ("Railway Spine").

ABSTRACT.

A case of fracture of the spinal column at the eleventh thoracic vertebra was described. After the accident there had been complete paralysis of motion and of sensation below Poupart's ligament, except on the outer part of the thighs. Although the spinal cord was much injured at the level of the first to the third lumbar segments, and to a less degree above this portion, sensation had been preserved in the areas innervated by the external cutaneous nerves. It has been shown experimentally that it is necessary to cut at least three spinal roots in order to destroy sensation in any given region. Probably the preservation of sensation on the outer part of the thighs was due to the presence of nerve filaments from higher levels than the first lumbar segment. The patient died five days after the accident, chiefly from exhaustion.

At the autopsy the dura was found intact, and no hemorrhage was observed within. The cord, even at the seat of fracture, was quite firm and of normal shape, and presented no indications externally of injury from pressure. The microscopical findings consisted of displaced fibres in one portion of the cord, numerous hemorrhages, altered blood pigment, masses of granular corpuscles, necrosed tissue, greatly swollen axis cylinders, degenerating myeline sheaths, tumefied ganglion cells, and some round cell infiltration. Some of the axis cylinders of the spinal roots were swollen, and the myelin did not stain as deeply as in normal sections. The case was very similar to the one recently described by Westphal, and while neither could be called a case of pure concussion, many of the findings were evidently the result of this condition. Westphal states that in most of the reported cases of traumatic myelitis death has occurred either immediately or else a long time after the accident, and that these are unfitted for a study of the early morbid changes.

Drs. Willard and Spiller refer to the many cases of "traumatic back" which are too often regarded merely as evidences of neurasthenia. Such lesions as they describe are doubtless present in less degree in many of these patients, though frequently associated with symptoms of neurasthenia. The restoration of function does not exclude the presence of organic changes, as shown by the remarkable case of Pott's disease reported by Charcot. They claim that they are not advancing an ungrounded theory. Obersteiner, Schmaus, Bikeles, Struppler, etc., have proven beyond question that organic changes in the spinal cord may follow trauma without fracture.

DISCUSSION.

Dr. F. X. Dercum.—I think we are much indebted to Drs. Willard and Spiller for this interesting contribution. We will probably all admit that we have in the past erred in calling some of the cases of "railway spine" functional. We should remember, also, that the fact that recovery sometimes follows after a time does not prove that organic changes in the cord have not been present. Again, it is not difficult to recall cases regarded as functional in which recovery has never ensued. I myself have frequently erred, I think, in laying too much stress upon the mere strain of the muscles and fibrous tissues of the back, and of laying too little weight on the motor and sensory disturbances as indicating probable changes in the cord.

As our knowledge progresses there will probably be left no functional diseases whatever, and lesions of the neurons will be demonstrated from almost all of the symptoms with which we meet.

Dr. G. Betton Massey.—This is an interesting subject and has an important medico-legal bearing. We are all apt to look with suspicion on patients who are sueing companies, and to make the mistake of regarding symptoms as due to neurasthenia at least, if not to malingering.

Dr. Dercum and I recently saw a gentleman who two years previously had been injured in a railroad accident and had undergone considerable immediate treatment in a hospital At the time I saw him, it was easy to believe that the man was a malingerer, if you were at all suspicious. That man had led an active life, so far as the upper portion of the body was concerned, during the year previous to the time I saw him, and yet there was apparently functional paralysis of locomotion. The nutrition was pretty good. I allude to the case only to call attention to the electrical tests which proved that the plaintiff had had a considerable injury of the cord from which he had not recovered. The examination proved that the man was and had been a serious sufferer.

Dr. Chas. W. Burr.—It seems to me that the clinical history of this case is not the kind that could properly be called one of "railway spine." The man was suddenly paralyzed from the waist down, with complete paralysis of the bladder and rectum, and had a fracture of the spine itself. In ordinary "railway spine" the symptoms come on more slowly and gradually get worse. I think myself that many of the cases considered to be functional, are really due to organic changes. In Drs. Willard and Spiller's case, I think that we could have said with certainty that the spinal cord was seriously injured, without making a post-mortem examination.

Dr. F. X. Dercum.—The distinction which Dr. Burr makes is, of course, important. Practically, we should distinguish between local concussion of the spine and that condition of general nervous shock which is understod by the expression "railway spine."

Dr. Chas. K. Mills.—While this was not a case of "railway spine" in the ordinary acceptation of the term, I understand that the intention of the writers is to teach us something of what happens in the cases known as concussion of the spine, by what occurs in the more severe cases of this character. In this case there was fracture and hemorrhage, but in addition there were found in various parts of the spinal axis evidences of injuries which were not directly connected with the gross spinal lesions. From this point of view the case is important, because we cannot expect to get autopsies in cases of the usual type. I have long been convinced that, in at least some cases, gross lesions occur. I believe that they are in the nature of small hemorrhages, particularly in the gray matter of the cord. Ever since the experiments of Duret on cerebral concussion, I have thought that an explanation similar to that given by him might apply to spinal concussion, although not so fully on account of mechanical and other differences.

Long ago I published in the *Medical Times* a case of intracerebral hemorrhage with inundation of the ventricles, which bears upon this subject. When you have intracerebral hemorrhage you have the brain struck a blow from within, just as in external traumatism you have it struck from without. In these cases there are many lesions. In addition to the gross hemorrhage there are in various parts of the brain ecchymotic areas and also minute hemorrhages in the white matter—capillary or small arterial extravasations. It seems to me that similar conditions must be of frequent occurrence in the spinal cord, and just as in brain cases many patients recover in spite of a number of minute lesions, so in the cord cases, recovery not infrequently ensues.

I have often wished that some one would throw more light on those cases of persistent anæsthesia which are sometimes seen. There is some inkling of light in the fact of the greater tendency to the occurrence of lesions of a certain kind in the posterior regions of the cord.

Dr. Spiller in closing the discussion said: It was not our intention to call this a case of "railway spine." The diagnosis of fracture of the vertebral column was made. Certain of the lesions as displacement of fibres, were due to purely mechanical causes; there were others, however, which could not be attributed to the fracture, but were the result of the blow which was severe enough to cause the fracture. Similar lesions have been found after concussion in cords when fracture has not occurred. It was, therefore, considered proper to attribute certain of the lesions in our case to concussion. A nerve fibre which has been injured may for a time be capable of function until gradually increasing degeneration destroys its usefulness. We may in this way, perhaps, explain the development of symptoms in "railway spine."

Dr. Mills has referred to lesions in the posterion horns.

It has been shown experimentally (Goldscheider and Flatau) that a colored fluid injected into the anterior horn has a tendency to pass to the posterior horn, and to ascend in this, if injected into the posterior horn, it does not enter the anterior to any extent. Blood poured out into the cord probably takes the same course.

We do not wish to go on record as denying the functional nature of many of these cases. We simply claim that frequently the organic element has been overlooked. The difficulty in making a differential diagnosis is very great. We would be inclined to believe that a patient were suffering from organic changes of the cord after severe trauma if he had paralysis of the lower limbs, either plastic or flaccid, according to the level of the portion damaged, if he had a sensation of compression about he waist, if the functions of the bladder and rectum were disturbed, and if the symptoms developed within a reasonable time after the accident. It is true, that even this group of symptoms may be purely functional, but it should give rise to grave suspicion of organic changes. We call that which we do not understand, functional, and the word is most unscientific. Hysteria is the chief of the neuroses, but it is difficult to explain all the manifestations of this disease on a purely functional basis. We refer to such conditions as gangrene, trophic lesions, or even death. If we accept the interesting and captivating theory of the amœboid movement of cells advanced by Lépine, Duval, Dercum, Pupin, Lugaro, etc., and apply it to hysteria, we are forced to believe that after a time the cell loses its power of extending its processes, and that organic changes occur within it. The many examinations made by the method of Nissl have shown us how very susceptible the cell is to external conditions. We know that within a very short time after section of a nerve fibre organic changes may be detected in the cell from which the fibre arises, changes which have been described as "reaction at distance." While we know of no thoroughly authentic case in which alteration has been found within the spinal motor cells after a hysterical contracture of long duration, we believe that such lesions may possibly exist.

The subject of traumatic neuroses has been recently rediscussed in Germany.